



# Capital University of Science and Technology

## Department of Computer Science

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### CS1143 - Object Oriented Programming

**Course Title:** Object Oriented Programming (CS1143)

**Pre-requisite(s):** Introduction to Programming (CS1133)

**Credit Hours:** 3

**Instructor(s):**

**Text Book(s):** C++: How to Program (Fourth Edition), Deitel & Deitel, Prentice-Hall

**Reference Book(s):**

- Object-Oriented Programming in C++ Author: Robert Lafore, Fourth Edition
- Object Oriented Programming with C++, Author: David Parsons, [2nd Revised], Published by: Thomson Learning

**Web Reference:**

- <https://www.tutorialspoint.com/What-is-object-oriented-programming-OOP>

### Course Introduction:

This course presents a conceptual and practical introduction to imperative and object-oriented programming, exemplified by C++. As well as providing grounding in the use of C++, the course will cover general principles of programming in imperative and object-oriented frameworks. The course should enable you to develop programs that support experimentation, simulation and exploration in other parts of the Informatics curriculum (e.g., the capacity to implement, test and observe a particular algorithm).

### Course Objectives:

This course teaches object-oriented programming to those who have learnt basic programming concepts and are ready to learn in-depth programming. It focuses on object-oriented programming using C++. The main concepts discussed are: Objects, Data Abstraction, Data Encapsulation, Polymorphism, and Inheritance. We teach the C++ language constructs that are used to implement



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these concepts. For example, Classes, Overloaded Operators, Overridden Methods, Friend Functions, Virtual Functions, and Templates, etc

### Course Learning Outcomes (CLOs):

At the end of this course, the students should be able to:

**CLO1:** Describe key concepts of object-oriented programming paradigm [C1 Remembering]

**CLO2:** Interpret real world problems in terms of objects rather than procedure [C2 Understanding]

**CLO3:** Apply object-oriented programming principles to implement small and medium scale C++ programs with simple graphical user interface [C3 Applying]

### CLOs – PLOs Mapping:

	CLO:1	CLO:2	CLO:3
PLO:1 (Academic Education)			
PLO:2 (Knowledge for Solving Computing Problems)	√		
PLO:3 (Problem Analysis)		√	
PLO:4 (Design/ Development of Solutions)			√
PLO:5 (Modern Tool Usage)			

### Course Contents:

Week	Contents
1	Introduction of the Course - Overview of Structured Programming in C++ - Function Revision (Call by Value, Call by Reference, Call by Pointer) - Pointer Revision
2	Object-Oriented Concepts (Introduction to Classes and Objects) - Data Members and Member Functions - Constant Member Functions
3	Use of Access Specifiers (public, private) - (Scope of class members) - Concept of Constructor and Object Instantiation - Importance of Destructor



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4	Constructor Overloading (No-argument Constructor, Parameterized Constructor) - Introduction to copy constructors
5	Shallow Copy and Deep Copy - Array as class data members (Initializing array with constructors) - Static and Dynamic Arrays, Array of Objects
6	File handling: how to open and close a file, read from file and write in a file. (ifstream, ofstream, fstream)
7	Introduction to single Public and Private Inheritance in OOP - Constructor and Destructor Chaining.
8	Protected inheritance, Class Hierarchies (Multi-level Inheritance) - C++ Multiple Inheritance
<b>Mid-Term Exam</b>	
9	Function Overloading and Function Overriding - Object as argument to the Function - Pointer to Objects. Introduction to polymorphism.
10	Pure Virtual Functions and Abstract Base Classes - Virtual Inheritance (The Diamond Problem and its Solution)
11	Relationships in OOP - (Association, Aggregation, and Composition) - Life Cycle and Ownership of Objects
12	Function Templates - Class Template Specialization, Standard Template Libraries
13	Use of Static keyword with class members, functions and objects
14	Friend Functions-Friend classes
15	Operator Overloading - (Unary and Binary Operator Overloading) - Assignment Operator
16	Overloading - Stream Insertion and Extraction Operator Overloading Function Templates - Class Template Specialization, Standard Template Libraries



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### Grading Policy:

S.No	Grading	% of Total Marks
1	Assignments	15
2	Quizzes	15
3	Project	10
4	Mid-term Exam	20
5	Final Exam	40
	<b>Total</b>	<b>100</b>